Rethinking the governance of energy poverty in sub-Saharan Africa: reviewing three academic perspectives on electricity infrastructure investment

Article (Accepted Version)

Rethinking the governance of energy poverty in sub-Saharan Africa: Reviewing three academic perspectives on electricity infrastructure investment

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Abstract: Sub-Saharan Africa is generally one of the most electricity deprived regions in the world. Since the 1990s, the World Bank and other relevant and respected multilateral organisations have consistently advocated that the required finance to develop sub-Saharan Africa's essential electricity capacity should be sourced from the private sector. However, despite this ongoing advocacy, the private sector has been unenthusiastic to answer this call. Much of the literature attributes this reticence to a lack of 'good governance': principally negative behaviours such as corruption. Instead, in this paper we argue that this is too simplistic an explanation, as private investment has still been able to thrive in other locations where such negative behaviours have existed. To support this argument, we utilise an interdisciplinary approach to review three separate academic governance perspectives, to deliver a more comprehensive view. These are: 1) Financial Investment Governance**,** the private sector investor's perspective, which focuses on the rules and institutions (or lack of) that directly influence the financial investment environment; 2) Political Governance, the political economy perspective, which relate to the negative, indirect investment consequences resulting from the way that governments govern; and 3) Technological Governance, a 'systems' perspective, which encompasses how the standard structure and organisation of the wider electricity delivery system in each country, negatively impacts such investment. In discussion and conclusion, we find that if the development policy perspective for delivering electricity access to the region is to be successfully constructed around private investment, as the multilateral development community advocates, it will need to accommodate 15 distinct issues that can be identified from this comprehensive approach to governance.

Keywords: Electricity supply; electricity infrastructure; electricity access; financial risk; governance; sub-Saharan Africa

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1. Introduction

This paper revisits how governance is used to explain why the private sector has been unenthusiastic towards investing in Sub-Sahara African (SSA) electricity infrastructure, by applying a multidimensional application of governance, which uses interdisciplinary perspectives. We do recognise that there has been a recent growth in private sector investment interest, through independent power producers (IPPs) [1] in the region. But this has been from a very low base and has a bias towards South Africa and partially Kenya, which are regional statistical outliers.

Electricity capacity growth rates in sub-Saharan Africa, not including South Africa (SA), over the last 40 years have been half those found in other developing regions [2]. Holstenkamp [3] writes that 95% of the population without access to modern forms of energy live in developing Asian and African countries, and that 'the challenge is considerable, especially in sub-Saharan Africa.' Historically, Official Development Assistance (ODA) was used to finance electricity capacity growth in SSA, but ODA was never able to deliver the level of resource that was required to satisfy the scope of this investment need. Towards the end of the last millennium, expectations shifted under the Wolfensohn's presidency of the World Bank, so that it was now deemed that such financing should instead come from private sector sources [4-5]. Since then, both senior personnel and policy papers from the World Bank and other respected multilateral organisations, have repeated this call for the private sector to finance SSA electricity capacity growth [6-13]. However, despite these constant calls for support, the private sector continues to show a dearth of enthusiasm for investing in SSA electricity infrastructure development projects – ignoring the current generationally low global interest rate levels and a recognisable desire from the international financial markets for investment opportunities surrounding infrastructure.

This private investor reluctance is recognisable by the lack of SSA sourced 'Clean Development Mechanism' (CDM) projects that have been registered, whilst conceding the technology restrictions of this measure – the CDM was defined in 2007 and is a market-based mechanism designed to elicit private sector participation: yet by the end of 2014, the SSA region represented only 0.63% of the total of CDM projects globally [14]: despite the financial markets – consisting of pension funds, insurance companies, sovereign-wealth funds, mutual funds, (to name the major constituents) – having more than 100 trillion $US in assets under management to invest [15-16]. With this level of resource, and the clear investment need for such infrastructure to be developed within SSA – a lack of enthusiasm could still be argued to be a generous description of the private sector's willingness to invest.

Governance – a term that encompasses factors such as accountancy and institutional capacity, political stability and bureaucratic flexibility – can play a vital role in shaping the direction and scope of private sector investment [17]. Yadav et al. [18] even go so far as to write that a transformation of 'governance models are required to meet the needs of communities living in rural and remote areas and particularly for those subject to energy and economic poverty.' Yet many approaches to 'governance' oversimplify the extent of the

challenges and tend to ignore the polycentric or systems level complexity that cuts across the actors, networks, and knowledge structures needed to address poverty [19].

Traditionally, when the literature utilises 'governance' to explain why the private sector is unenthusiastic for investing in the region's electricity infrastructure, it often applies a narrow interpretation that centres on negative behaviours such as corruption. As private investment has still been able to thrive in other locations where such negative behaviours have existed [20], we challenge this view and argue that the literature is too narrow in its governance focus. As a decision to invest is a function of risk and reward [21-23], we instead contend that the lack of investment interest is a result of a financing 'market failure' related to excessive 'negative uncertainties' or risks[1]: and these risks derive from the indirect unintended consequences of the governance process, rather than the governance process itself. To do this, we utilise three separate academic perspectives to build a holistic picture of how the current governance application surrounding the development of electricity infrastructure contributes to risk. In this paper we call these three perspectives:

- **Financial Investment Governance:** the private sector investor's perspective, that focuses on the rules and institutions (or lack of) that directly influence the investment environment in SSA;
- **Political Governance**: the political economy perspective, that focuses on the indirect investment consequences resulting from the way that SSA governments govern.
- **Technological Governance**: a 'systems' perspective, which encompasses how the standard type of structure and organisation of the greater electricity delivery regime in SSA, negatively impacts such investment.

Before scrutinising each of these perspectives: first we define what is meant by 'good governance' in this paper, as there is no common definition of the term and it is often ideologically charged [24]; we then explain what is meant by private investment; we clarify why investors invest; we summarise the standard characteristics of this type of infrastructure investment; and we explain how negative uncertainty deters investment.

To define our three academic perspectives, an extensive interdisciplinary literature review was conducted, principally integrating theories from across four separate academic disciplines: investment finance, project management, development studies, and innovation studies. The investment finance literature contributed to dimensions such as why investors invest, why excessive negative uncertainty deters investment, and outlines the parameters of investment governance. The project management literature furnished its theories on risk, as most electricity infrastructures are developed through projects and risk forms a major part of that discipline's theory. The development studies literature supplied its theories on political economy and data for the three perspectives. The innovation literature offered its theories on systems and regimes;

[1] In this paper, both terms refer to the factors that cannot be pre-determined and can negatively impact an investments performance. It is accepted there is a degree of ambiguity and subjectivity surrounding the exact meaning of both these terms – within the financial markets (as this is a paper concerning private investment) and within the project management academic literature, the term 'risk' is usually regarded as being interchangeable with 'negative uncertainty'[21,25,26].

and the 'diffusion of technology', as electricity infrastructure development is essentially a diffusion of technology.

2. Conceptual Approach and Key Terms

Here, we introduce readers to three core concepts or terms used throughout the article: 'good governance,' 'private investment,' and 'risk.'

2.1 **Grappling with *good governance***

Governance broadly refers to any of the multitudinous processes or institutions in place by which people set and enable rules needed to reach desired outcomes [27]. While most commonly envisioned as the domain of governments, many other actors are involved in governance, including civil society organizations, corporations, and institutions of finance. Governance, when it concerns SSA, is often applied narrowly, negatively and ideologically as a description of an act of financial misappropriation [20, 24], through a 'principal-agency' framework [28]. Such misappropriation is possible through the abuse of a power asymmetry, often held by individuals on behalf of the structure of state: this imbalance is then used to obtain a non-state obligatory financial gain [29]. Although this is a legitimate perspective of governance in our context, it represents only a small part of the theoretical lens that shapes the governance matrix that we use in this paper. Instead, we apply the term governance less rigidly and ideologically, using a much wider definition and utilising different stakeholder perspectives.

Firstly, our definition of governance will apply a systemic approach: encompassing interactions and decision-making among all the various relevant stakeholders, reflecting the gradients of power and influence, involved in a collective problem – that being in this paper, the development and operation of electricity infrastructure within SSA. These interactions then lead to the creation or reinforcement of rules and social norms, along with accompanying institutions [24]. Secondly, governance efficiency and sustainability (good or bad) is determined by its ability to deliver acceptable outcomes for all the relevant stakeholders, by successfully aligning stakeholder interests [30].

We argue, that the principal reason there is so much ambiguity in establishing what 'good governance' entails and the reason for the apparent obstinacy in achieving it in a SSA context, is due to its effectiveness being normally defined from the perspective of the stakeholder that is applying it: in other words, it is normative in its application [24]. This dichotomy is quite easy to observe in our field of study, by the apparent conflict of application between the interests of SSA national governments and those of the external financial donor countries: over accusations of corruption.

As successful electricity infrastructure development is supposedly the desired outcome for all stakeholders, all sponsors apparently want the successful delivery of affordable and reliable electricity, good governance should not in fact be the issue at all. The reason that it is we argue, is because the negative impact of the unintended consequences of governance outcomes, are not equally appreciated by all stakeholders and the benefits of such development are being contestably apportioned. Good governance is in fact a *'collective action'* problem [20]:

achieving it requires a holistic understanding of what it should entail for all relevant stakeholders, and agreement about its fairness by all sponsors in its application. Good governance, therefore, requires a belief in its legitimacy [31].

2.2 Conceptualizing *private investment* and how it is impacted by *risk*

In most of sub-Saharan Africa (excluding South Africa), the domestic banking system is not able to privately finance any significant capacity increases in electricity infrastructure; compounded by there being few: significant corporate, non-government institutional, or 'private office' investors [16, 32, 33]. So, in the context of this paper, private sector investment will refer to internationally sourced (out of region) private investment.

Applying Occam's razor: an investment can be defined "as the act of incurring an *immediate cost* (the value of the investment) in the expectation of *future rewards* (the investment return)." [22]. This definition suggests: that there are two related, but separate elements involved in an investment; and that investors require certainty of outcomes from the second element, in response to the first.

A decision to proceed with an investment, is also a relative decision, as any individual investment opportunity does not exist in isolation, as there are always many alternative investments that exist [21-23]. This means that there exists an *opportunity cost* when investing in electricity capacity in SSA, as the financial resources of that investment can no longer be utilised elsewhere. Investors will therefore discount the perceived *future rewards* of an investment, in response to any risks that can impact those rewards.

Further, an investment in the development of new electricity infrastructure in SSA will be illiquid – meaning that such an investment cannot be easily removed, sold, or exchanged for cash, without a potential significant loss of value [34]. In any sort of electricity infrastructure development in SSA, the investment's value will be tied to the location that the asset has been constructed within (the asset cannot simply just be removed and taken away intact) [29]. The only way therefore for the investment to realise its value as an investment, is for it perform as it was intended when the investment was planned. Additionally, infrastructure investments of this type will be long dated, usually more than 20 years; and if their tariffs are correctly set and regulated, such infrastructure will also represent a 'normal' margin business[2], without excessive profitability [35].

2.3 Consequences of *risk* through 'optionality', 'cost' and 'reward'

So, when taking an investment's: relativeness, illiquidity, normal margins, and long dated timeframes into account – a private investor's willingness to proceed with an investment opportunity, will be determined by the perceived level of 'negative uncertainty' or risk that

[2] **Normal Margin** is determined by a 'benchmark' interest rate such as LIBOR, plus a weighted average cost of capital (WACC). WACC is a calculation of a firm's cost of capital in which each category of capital is proportionately weighted, to represent its relative risk to its alternative uses and its absolute risk profile [36].

surrounds the ongoing value of their *immediate cost* of entering that investment and the likelihood of attaining the expected *future rewards* [21-23, 34].

Risk impacts a decision to progress with an illiquid investment in three ways: it firstly delays a decision to proceed, by amplifying the value in deferral (a type of optionality); secondly it forces an investor to **discount** the future rewards for participation, which both reduces the desire to proceed and makes alternative investment opportunities relatively more attractive; and thirdly, it discourages opportunity evaluation by professional investment managers.

In SSA, from the private investor's point of view, there is no urgency to invest – as there are many more electricity projects needing investors, than investors needing electricity projects. If we treat the ability to delay an investment, as being 'like having the right to choose when to invest at some point in the future' – we can place a value on that right to delay, by treating it as a synthetic option which has a value[3] [22]. This 'optionality' value will then cease to exist, once an investment proceeds – just as a normal option ceases to have value once it is exercised. Therefore, proceeding with an investment, destroys the synthetic options value. Further, the more risk that surrounds an investment, the greater the value that can be implied to the right to delay the commencement of an investment [22, 37].

Investment is a relative decision, as any individual investment opportunity does not exist in isolation. Investors will therefore discount the perceived 'future rewards' of an investment in SSA, in response to excessive negative uncertainty (in SSA, often to zero), against any alternative opportunities that are not so burdened. This makes the investment a less/un-attractive proposition, and in response to this: investors will either demand a higher return, undermining the project's commerciality and attractiveness as an investment; or they will just invest elsewhere, probably in an unrelated location [22, 34].

We also need to appreciate how excessive negative uncertainty impacts the evaluation methods of the actual private sector investment management teams. In the competitive, highly paid 'job market' that is the finance industry – an investment manager can expect to lose their job if they make flawed investment decisions, particularly ones outside customary investment parameters which are illiquid [34] – *they move away from the heard*. Equally there is also an expectation of quality productivity, they are not expected to forever evaluate investment

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[3] A financial option is a form of 'financial derivative':

- It is a standardised contract, which is derived from the existence of an '*underlying financial instrument'*: such as an equity, bond, or currency.
- It grants the owner of the option, either a right (but not an obligation) to buy or sell the underlying financial instrument before and/or at a '*point in the future'*, for an agreed price and terms.
- This delayed right to buy or sell **has a value**, which can be calculated using a formula (commonly using an algorithm, known as Black and Scholes[3]).

The option ceases to have value, either after it is exercised or when it expires (the '*point in the future'*, is past). The options value both increases and decreases, with the level of risk over the price of the underlying financial instrument (*volatility,* in options language).

A **'synthetic'** option is a situation that presents the same characteristics and opportunities as those offered by a physical option: and can be valued as such) [37].

opportunities, without proceeding with some of them. For ongoing employment and productivity reasons therefore, investment managers prefer to evaluate opportunities with more certainty of outcomes, not less. Finally, it should be noted that the investment attractiveness of normal margin businesses with very high up-front costs, such as electricity infrastructure, are particularly sensitive to risks.

With these basic terms (which we will continually refer back to) laid out, the next three sections of the paper spell-out the three very different perspectives on electricity governance in SSA.

3. Financial Investment Governance

This governance perspective encompasses the rules and institutions (or lack of) which directly influence the investment environment in SSA. It is observable, by applying Dixit and Pindyck's definition of investment *(sec 2.2)* to governance, that there is a period of uncertainty between the initial cost and the future rewards. To reduce risk therefore, 'good' investment governance will entail factors that protect the 'immediate cost' of an investment and then enable the delivery of the 'future rewards' proficiently and with certainty, consistent with the expectations of the investment when it was planned; and bad investment governance concern factors that destroy or remove value from both the 'immediate cost' and the 'future rewards' of the investment. These will now be characterised as the ability to appropriate.

With SSA electricity infrastructure development, there are several observable structural governance factors that are perceived as being common in SSA by private investors, that can prevent the ability to appropriate, producing a compromised investment environment: these are now categorized below.

3.1 Uncertain property rights

Central to understanding how uncertainty impacts an investment in new electricity infrastructure in SSA, is the concept of investment's physical illiquidity discussed earlier *(sec 2.2)*. With standard electricity infrastructure development in SSA, the investment's value will be tied to the location that the development has been constructed within. The certainty of ongoing ownership of the asset and its revenues is therefore crucial. Any negative uncertainty surrounding the support of property rights, is therefore a fundamental structural governance issue that destabilises investment [38].

The governments of SSA take significant pride in their national sovereignty of their territories and the assets that reside within them; but as this pride is often realised by the usurping of property rights when it is deemed expedient, this creates unintended negative uncertainty, reducing the attractiveness for foreign private investment. The past behaviour of the Mugabe regime in Zimbabwe, particularly over the ownership of land, represents a good example of such outcomes [39]; also, it should be noted that there are currently policy discussions whether similar activities should be repeated in South Africa.

3.2 **Excessive planning costs due to a lack of standardisation.**

In much of SSA, there is no standardisation of the tender process and/or paperwork for a privately financed electricity infrastructure project', particularly for unsolicited bids [40].

Because of this governance issue, "*it takes projects in Africa on average seven years to advance through the project development cycle"* [40] and the planning costs can be as high as 10% of the project value, in contrast to the OECD standard of under 1% [41]. For example, in Kenya, a Power Purchase Agreement (PPA) was 1000 pages long, where an equivalent Indian off-take agreement for electricity would be expected to be only 20 pages [4].

It is challenging for an under resourced government that is already struggling to deliver all the services that are expected of it, to further facilitate such a specialist capability, but their failure to do so has unintended consequences. The costly commitment that is entailed in producing a comprehensive tender represents a significant 'sunken cost' for the sponsor, which is difficult to justify when there is no certainty of reimbursement. This risk discourages investment interest from ever arising, particularly as tariff regulated electricity infrastructure is a relatively low margin business with very high up-front costs on top of this planning cost [42]. The higher the fixed set up costs are as a percentage of the total value of the project, the greater the negative impact on investor interest as a response to this uncertainty [21,22]. It is to mitigate this issue that South Africa has created its IPP Office[4] (some argue, with great success) and the IFC has instigated its 'Scaling Solar' program[5] [32].

3.3 **Reallocation of project ownership/control.**

Past unexpected reallocation of larger scale infrastructure projects to an unrelated party, usually between the planning and construction phases, have also created huge indecision amongst investors as it creates the perception of policy uncertainty [43]. This transfer again results in an instant loss of value of the discussed preparation costs up to that point, discussed in *(3.2)*, by an investor. This is slightly different risk to uncertain property rights, discussed in *(3.1)*, as reallocation of projects usually occurs because of excessive delays in the commencement of a projects construction – but as excessive delays are *'par of the course'* in SSA, due to the many challenges that surround projects in the region, this is questionable in its legitimacy. Examples of such reallocations are: The Grand Inga dam project in the DRC and The MphandaNkuwa dam project in Mozambique.

3.4 **Equity dilution, ownership restrictions, and 'local content' procurement.**

Conventions, both explicit and implicit, that convey a percentage of domestic (African) ownership are widespread for 'greenfield' infrastructure projects throughout SSA: where an extraterritorial privately owned project is expected/required to allocate a significant percentage of its ownership (equity) in that project to domestic interests (such policies are not unique to SSA). South Africa has its Black Empowerment legislation[6] and Mozambique has local equity

[4] https://www.ipp-projects.co.za/
[5] https://www.scalingsolar.org/
[6] https://www.thedti.gov.za/economic_empowerment/bee.jsp

ownership rules concerning Public Private Partnerships (PPPs)[7] of 5-20% of the equity in the project[8], as examples; but these arrangements often can be less transparent[9]. This can be a very constructive feature of governance, when done in ways that deliver value to a project, as it helps to allocate value to domestic interest and align both domestic and foreign stakeholder interests (which forms part of our 'good governance' objectives – *sec 2.1*) – but equally destructive, when it removes value.

The introduction of new stakeholders at the equity level, "*even from the development stage of a project, {potentially} introduces cleavages between partners. As a project expands to include more participants, it becomes more difficult to allocate the project's potential value in a way that all stakeholders see as fair. Greed generates an imbalance in the distribution of the project's costs and rewards—an imbalance that grows with the scale of the project, generating seeds of resentment along the way. The award winning construction project analyst Edward W. Merrow, claims that the inability to allocate costs and benefits fairly dooms most {projects} before they ever get started. However, even when the projects do proceed, those who believe they have been treated unfairly never let go of their opposition. Instead they generate what he describes as project "turbulence" that often overwhelms even the most well- intended project management*" [33:45].

Lastly, in South Africa there are also local content rules that dictate a necessary level of local procurement to be included in a project, even if this is sub-standard to or more expensive than alternative overseas sourced materials[10]. In other SSA countries, as there is no applicable industry to support, this is a less pertinent issue except for how it can impact employment: the employment of local unsuitable staff may be encouraged over better qualified expatriate alternatives.

The worthy intention of all three practices is to enhance domestic ownership of important assets and/or increase domestic participation in the recipient country's economy; the unintended consequence of such directives is to create risk through the transfer of value, which then impedes the investor's ability to appropriate.

3.5 **Exchange rate convertibility**

This dimension from the financial governance perspective concerns the inability to repatriate the initial cost and the rewards of an investment, into the original currency of the investor [33].

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[7] Public Private Partnerships (PPPs): This is the standard type of investment vehicle that is utilised by SSA governments, to attract private sector investment for infrastructure development. The World Bank PPPIRC defines it as: "A long term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility, and the remuneration is linked to performance." (ppp.worldbank.org)

[8] Legislation: Law 115/2011, August 10 – Public-Private Partnerships (PPP), Business Concessions (BC) and Mega-Projects Law (MPL).

[9] https://www.transparency.org/

[10] https://www.ensafrica.com/news/Revised-Preferential-Procurement-Regulations-2017?Id=2575

In SSA, all currencies are termed 'soft' (excluding SA), meaning they are illiquid and not easily exchangeable in large value transactions. As discussed earlier, electricity infrastructure investment needs to be sourced from overseas *(sec 2.2)*, but the investment's revenues are domestically produced: this creates a significant inability to repatriate the immediate cost of an investment back into the original currency of the overseas investor [33]. This becomes a governance issue, when the illiquidity is compounded by exchange controls, which prevents any repatriation of money from the country. For example, Mozambique introduced such restrictions in 2016, where unless the funds have been earned through export (domestically sold electricity doesn't qualify), they cannot be repatriated from the country [44[11]]. The inability to repatriate funds by an investor is the ultimate barrier to appropriation and is an investment killer: as this removes both the 'future rewards' of an investment as well as destroying the 'initial value'. This risk is a factor that is often missed by the academic development literature [16].

3.6 **Monopoly control of electricity supply**

As the availability and affordability of electricity supply is widely regarded as a public good [45], it is standard practice throughout SSA for the electricity utilities to be government owned and protected, with monopoly rights over grid supplied electricity [35, 40]. This reality however requires that investors accept that their customer for any electricity commercially generated, will likely be a recipient country's utility – but these utilities do not have an investment grade credit rating, preventing them from being considered a credit worthy counterparty from the perspective of an investor [1, 2, 35, 40, 46]. The unintended consequence of such monopoly control is again a disruption to investment: barely solvent monopoly utilities represent a significant investment risk.

A standard way around this, is for the actual government to offer guarantees: for example, Kenya has partially done so with the Lake Turkana wind farm project, through guaranteeing/underwriting connectivity of the project to the country's electricity grid[12]; Tanzania has granted sovereign guarantees to the Songas project. However, SSA governments are often reluctant to give such guarantees (see *sec 5.3*) [46, 47], and when they do, they can refute their obligations giving rise to a 'credit rating' issues as well, as also happened in Tanzania surrounding the Independent Power Tanzania Limited:

> "The dispute relates to Claimant's alleged investment in Tanzania, by way of a loan acquired by its subsidiary, Standard Chartered Bank (Hong Kong) Limited ("SCB HK"), made to Independent Power Tanzania Limited ("IPTL") in order to finance a Power Plant in Tanzania located in Tegeta, approximately 25 kilometres north of Dar es Salaam"[13].

[11] https://www.bloomberg.com/news/articles/2016-08-05/mozambique-sets-foreign-exchange-limits-standard-bank-says

[12] Aldwych International – the developer

[13] Case between Independent Power Tanzania ltd (ITPL) and Standard Chartered Bank https://www.italaw.com/sites/default/files/case-documents/italaw1184.pdf

3.7 **Uncommercial tariffs**

Commercially unrealistic tariff regulation, which restricts the ability of an investor from capturing enough value to deliver a minimum suitable level of 'future rewards' from participation, is very common in SSA. The usual argument cited for the uncommercial, low levels of tariff: is that it protects poor consumers against unaffordable and expensive electricity. The reality however is that low-income households are excluded from the electricity supply and will continue to be so if private investment doesn't increase; instead it is the successful political lobbying from wealthier consumers, particularly from business, that keep electricity prices low [2, 40].

Throughout SSA it is not unusual for tariff rates to be below the actual cost of generation. So, when you consider there are also substantial losses of electricity in the transmission process, for example 25% in Tanzania [45]; and a significant failure of customers paying their bills [1,2, 45, 48], this is a major risk for investment. It should be noted, that the recent electricity generation cost reductions through renewable technologies, could be starting to improve this issue: in 2016, Zambia completed a solar tender at (US) 6.02c/kWh the cheapest renewable tariff to that date in the region [32]. However, this creates a new kind of risk, which will be discussed in the *Technology Governance* section *(sec 5, comments about Nigeria and tariff expectations).*

3.8 **Uncertain protective 'Law and Order'**

This final financial concerns both impacts on the physical infrastructure and the key staff that are relied upon for the efficient operation of an investment asset.

Infrastructure can be damaged through acts of terrorism, vandalism or criminality; and key staff (especially expatriate), are increasingly under threat of unreasonable harassment by police and other 'officials', and in extreme circumstances kidnapping for ransom [49]. In Mozambique for example: RENAMO (the current political opposition and former military foe during the country's civil war) have recently threatened to again resort to armed conflict[14]; or the local police often supplement their unreliable incomes with harassment of foreign identifiable personal.

In both Kenya and Zimbabwe (amongst others), significant political tensions exist between the government and opposition, which have manifested recently in major public disorder; where in Kenya transmission infrastructure is continually vandalised or has electricity is stolen from it, by marginalised populations; and key personnel are subject to kidnapping [16, 50]. In South Africa, as a legacy of the anti-apartheid struggle, vandalism of electricity infrastructure is seen as a legitimate form of protest by the politically frustrated that are upset about continuing poor access to electricity; and large scale, organised theft of infrastructure is a common occurrence, particularly within the Gauteng municipality area [51, 52].

[14] https://www.ibtimes.co.uk/negotiations-between-frelimo-renamo-suspended-mozambique-war-escalates-1573691

The unintended consequences of this is to make it difficult to operate an investment efficiently: as the assets maintenance costs will be very high, and it is difficult to recruit and preserve the skilled staff that are required to manage or maintain the asset [42]. This then requires levels of compensation or contingencies, which weakens appropriation.

4. Political Governance

This governance perspective concerns the indirect investment consequences resulting from the way that SSA governments govern. Statements delivered in an official capacity by various SSA government representatives at a recent African energy conference in South Africa[15], suggests that their governments understand that having access to the necessary finance to construct electricity infrastructure, is central to their ability to deliver an affordable and reliable electricity service to their populations. And further, those governments appear to accept that the only realistic source for this finance, is through the successful engagement of international private investors.

Yet despite this declared recognition, we argue that there is still an ongoing disconnect about what is required to deliver this investment from a governance perspective, due to a failure of each government's own narratives to appreciate the indirect consequences of how they govern. This is perhaps because the relevant 'political actors' are too focussed on their own direct political needs, rather than appreciating how their governance activities undermine the wider investment environment.

To help appreciate this incongruity, it is possible to un-pack political governance failure into three causal components:

1) A power asymmetry – there is a power imbalance between the insiders (the political class) of the recipient country and the outsiders (the investors) without a reliable avenue of recourse if/when this asymmetry is abused [20, 29];

2) Neo-patrimonialism – the governing elite's need to finance a political patronage system, to maintain control of the political structure that delivers benefits to those that administer it [53, 54];

3) Policy confusion – uncertain and repeatedly changing policy priorities, driven by the contradictions of fulfilling the different needs of four separate constituencies: the political leadership, the leadership's principal supporters, the larger electorate (usually driven by an election) and multilateral stakeholders (such as aid donors or development banks). The resulting policy fluidity is then incompatible with the long-time horizons that the standard method of financing such infrastructure requires: known as Project Financing (see 4.2).

From these three components, we can then extract two classes of investment risks: those that arise from financial misappropriation; and those that arise from government policy fluidity.

[15] The 2018, Africa Energy Indaba – February, Johannesburg, South Africa.

4.1 **The risk of misappropriation**

Financial misappropriation through informal 'rent-seeking' [55] that is facilitated by an abuse of asymmetric power, is the standard interpretation of governance failure that is applied to SSA [20, 29]; and a regular explanation advanced for the lack of foreign investment in the region [4, 46, 48, 56]. Whilst accepting such misappropriation is a burden on investment, we however advocate in this paper that this is an oversimplification of the challenge, which then obstructs our ability to create a robust enough governance structure to permit overseas investment. Many forms of 'rent-seeking' have been apparent in the recent and rapid economic transformations in China, India, Brazil, and South East Asia, yet these regions have still enjoyed rapid and constructive economic growth [20] – so financial misappropriation cannot be a definitive explanation for a reluctance to invest on its own. Instead we argue: it is excessive and uncertain 'rent-seeking' that destabilises the investment landscape. If the value of any required appropriation is foreseeable and is not excessive, an investment can still proceed and be successful; and such appropriation could even be legitimately formalised, as has occurred in Australia with their various government sponsored 'resource rent taxes'[16].

An electricity utility that has effectively regulated tariffs, is a 'normal margin 'business model, as the tariff regulation limits the ability to charge a 'rent' creating value (in fact, as discussed in *sect. 3.7*, it is usually difficult to even achieve a normal and reasonable investment return from the ownership of electricity infrastructure in SSA). This prevents the existence 'economic rents' as described by Anne Krueger [55] from existing, unlike 'say' the large 'rents' that are available from within the resource extraction industries. In SSA, there is strong evidence that 'rent-seeking' can often become disconnected from the existence of rents, as the expectations and pressures of the neo-patrimonialism system encourage rent-seeking behaviour from its 'political agents', regardless of whether rents exist to be captured. Further, *"privatisation and liberalisation might reduce rents, but increase rent-seeking behaviour or endeavour to acquire rents"* – as it both introduces commercial transparency, efficiency, and competition; whilst also creating more layers of bureaucracy and therefore possible 'rent-seekers' [54:27]. This means that the electricity infrastructure business model is not sufficiently robust when faced with any sizable uncertainty regarding misappropriation, as it is vulnerable to becoming un-commercial when consistent illicit demands are placed upon it. As foreign investment in SSA is normally associated with the high 'rent' carrying business models associated with resource extraction, it is unclear how comprehensively SSA 'policy actors' appreciate this financing vulnerability (or care) that is applicable to electricity infrastructure projects [16].

4.2 **Policy fluidity risk**

Policy fluidity encompasses the issues of regulation and policy inconsistency, which disrupt the embedded factors which are necessary for the financing process, during an asset's development and operation. These can impact either infrastructure cost inputs, caused by (but

[16] https://www.ato.gov.au/Business/Petroleum-resource-rent-tax/; http://www.minerals.org.au/file_upload/files/reports/Deloitte_WA_Iron_Ore_Royalty_Analysis_7_Nov_2016.pdf

not limited to) issues such as technology application or procurement directives, creating investment risk; or infrastructure revenue outputs, caused by (but not limited to) such matters as controlled tariffs or taxes, which dilute investment return certainties. The reason government consistency is important, is due to the mechanics of the standard approach to financing electricity infrastructure that the private sector can use in SSA, which the finance industry labels 'Project Financing[17]'. Any behaviour by government that cannot be predicted for the life of this financing process, normally 20 + years, discourages potential investors [43].

Governments are inconsistent in their policy, due to a continually changing order of priorities that are dictated by the conflicted agendas of the four different constituencies listed in this section's introduction under 'Policy Confusion': which frequently change depending on the expedient needs of government. This type of uncertainty has been developed even further, by Erdmann & Engel [54], to include an additional structural component that they have added to their neo-patrimonialism governance theory.

> "*Neo-patrimonialism is a mix of two types of domination. Elements of* {both} *patrimonial and legal-rational bureaucratic domination*[18]*,* {that then} *penetrate each other*." *"The distinction between private and the public, at least formally, exists and is accepted, and public reference can be made to this distinction – it is a different matter whether this is observed or not."* [54:18]

Policy risk arises, as it is unclear whether rules will be followed or ignored – and ironically, the increase in transparency and modernisation of bureaucracies can increase this confusion.

These policy inconsistencies just described, can often be initiated by the unintended consequences of an attempt to implement 'best practice' policy by African governments – attempts to behave in a manner expected by multilateral stakeholders such as the World Bank, despite the internal needs of the incumbent political system; or by attempts to implement the unsuitable advice of 'outside experts', within a context of a 'capability' and knowledge deficient skillset.

For example, this occurred with the advent CDM, where African governments were led to believe that their countries would be huge beneficiaries of the CDM, resulting with many making significant reorganisations internally to support it – yet when the CDM commenced, it in fact had little impact [14, 57].

It is possible that a policy misdirection is about to occur again, surrounding nuclear energy: companies associated with the Russian nuclear industry, are encouraging African governments to adopt nuclear energy in their electricity policy mix (as witnessed at a recent African energy conference[19]). This is likely to have a substantial negative spill-over effects on wider

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[17] Project financing – a project's cash flows ('*future rewards'*) are pre-determined and then protected or guaranteed in some way, which allows it to be attributed a value. Finance is then secured and advanced, against this projected value. The longer the guaranteed time period, the greater is the value that is available to act as 'surety'. Such a process requires both the reliability and protection of the required cash flows, which demands both cost and revenue certainties to exist [58].

[18] A pillar of Max Webers tripartite classification of authority – whereby decisions are reached through a process of: legal rationality, legal legitimacy, and bureaucracy.

[19] The 2018, Africa Energy Indaba – February, Johannesburg, South Africa.

investment if pursued, because of an alternative highly negative narrative held by unrelated potential investors on the subject – nuclear energy introduces a new set of risks, related to safety, long-term commerciality, and issues of disposing of spent fuel.

5. Technological Governance

Technological Governance is a '*systems*' perspective that concerns governance issues that arise from the wider system of organisation and application of current electricity provision technologies: which in this paper we refer to as the 'electricity delivery regime'. This governance perspective is not about using a specific *systems* theory; we are instead using the term *systems* as means of defining our spatial and temporal limitations of study: what is in and out and which actors (stakeholders) to include. The predominant type of electricity system utilised in SSA, is a top down network 'hub & spoke' system [35], which is also the standard OECD model/regime for delivering electricity. This type of model, is government controlled and surrounds the utilisation of a series of large-scale electricity generating assets, with supporting transmission and distribution structures. However, this is also a 'path dependent' model [59, 60], that is both expensive to build and operate.

As a proven electricity delivery model, it has served OECD countries well. But in the SSA context, where significantly more than half of the region's population lives in rural areas and derive their livelihoods from subsistence agriculture, it is an unsuitable structure for attracting private investment support. This is because in SSA, the model is constrained by three systemic impediments:

1) The inability of the majority of African households to afford both the cost of electricity connectivity, particularly in rural areas; and then to use the electricity, once it is available – undermining the commercial proposition;

2) A failure by the centralised monopoly utilities, to manage and operate such a model efficiently and successfully in the region – making the utility an unattractive investment partner;

3) A shortfall in the required political capital and support from the relevant political actors – to ensure that this electricity delivery regime can maximise its potential efficiency and revenues.

These hurdles do not necessarily mean that alternative models of electricity delivery cannot prosper, but it does mean that whilst these factors persist, this kind of electricity delivery regime will remain unattractive.

As if these three impediments were not enough for potential private investors to contend with, a destructive *'perfect storm'* has recently arrived. These three traditional challenges are now being compounded by a fourth: the global transition in what type of electricity service technology is best to use – the traditional one, utilising fossil fuels; or the challenger, that utilises distributive renewable technologies [61, 62]. From the investment perspective of a private investor, fossil fuel technologies are likely to become uncompetitive and redundant, a '*stranded asset'* problem [63]; but the replacement distributive renewable technologies are still immature, and not yet commercially delineated [62]. Investors prefer to invest in proven

processes, which utilise familiar technologies with a competitive and predicable cost structure [21] – this technology realignment, removes these certainties.

Further, the current continuous improvement in renewable technology tariffs is also encouraging commitment delays surrounding new electricity infrastructure, from some of the region's governments, as they anticipate further reductions in tariff pricing; and fostering unrealistic tariff expectation from specific SSA governments: apparently Nigerian officials expect the recent low tariff struck in Zambia (US6.02c/kWh), to be a pricing benchmark for their own electricity projects, regardless of the substantial difference in each country's perceived risk profiles to investors (their relative attractiveness as an investment destination – Zambia verses Nigeria) and specific factors such as the availability of soft loans that would not be available to Nigeria, that supported such a low tariff[20].

As most SSA governments remain committed from a governance perspective, to a centrally controlled monopoly, as its electricity delivery regime [1, 2, 35, 40, 46] the impact of each of these three systemic factors need an appreciating in this context.

5.1 **Unaffordable electricity services**

The inability of SSA households to afford electricity services, is often offered as the principal reason for the existence of electricity poverty in the region [2, 40, 64, 65, 66]; and this is not just about paying for connectivity or delivering electricity to the front door of a household, but also includes the costs associated with being able to then use it: such as the cost of electrical appliances or safely 'wiring' the recipient's home [67,68]. Although these are not governance issues in themselves, how to respond to their realities most definitely are; and how to successfully overcome these realities, we argue, should be a central governance priority.

The network 'hub & spoke' system is somewhat suitable for electricity delivery in the region's principal urban areas, however its commerciality becomes unrealistic when it is deployed into rural areas, where the majority of SSA's population lives and electricity poverty is most extreme. Extending the grid, is both very expensive to do and then properly maintain: in Kenya for instance, according to Parshall, et al [69], it costs US$1,900 to connect the more remote households (and this is likely to have increased), with no account for the cost of ongoing maintenance of the network or the further burdens of making it usable by households [64] – this cost is beyond the resources of all but a few select households. Such grid extensions are therefore difficult to justify commercially, a prerequisite for private investment, despite the obvious 'positive externality benefits' [70] offered by such connectivity [4, 65]. For the grid to be extended, it needs to be based on a subsidy from an unrelated source: which is usually the government through a form of rural electrification agency or program [35].

The unintended consequences of persisting with this delivery system, for potential investors: is that it removes any likelihood of their participation in the distribution aspect of the infrastructure regime, as they are even more disadvantaged than the government as owner of such assets, as they are unable to capture any of the externality value [4]; and as an

[20] Comments received from several industry professionals, attending a recent conference in Johannesburg.

independent power producer (IPP) [1], it weakens the utility's credit worthiness (who will be the 'offtake' customer), as ongoing subsidies from fiscally weak governments are uncertain – this is, unless an un-related to the customer (either the utility or end using consumer) financing structure can be identified.

The extent of this challenge is probably best illustrated by the experiences of SA's '*rapid electrification program'*, during the transition period from apartheid.

> "*Prior to 1990, less than a third of the population {of SA} had access to electricity. By the end of the decade that proportion had doubled*" [71:3125].

By the mid-1990s, it had become evident to Eskom that further electrification through grid extension, was not a commercial proposition, and could only be carried out through deficit financing off its own balance sheet and through cross subsidisation from other industrial and wealthy municipality users. This, however, is not an option for other SSA countries, as they do not have such endowments – and some of Eskom's current financial vulnerability problems, can be argued to have started with this balance sheet subsidisation. The SA government finally took over the responsibility for financing the program from the early 2000s, through a national electrification fund [71] – but still electricity access is not universal, almost 20 years on.

Distributive renewable technology can sidestep the grid extension issues just highlighted, as such technologies no longer require the utility grid network, for delivery: as they can be operated on a smaller scale (reduced cost) and independently of the electricity grid. Despite this however, affordability is still an issue, as such technology options still require a large financial outlay relative to rural household incomes. More importantly, as such technologies are still making significant advances in both cost and efficiency – it is sensible for investors/developers of larger capacity infrastructure, to delay investing in this technology, until it has matured and become stable, from an electricity unit (kWh) cost basis.

5.2 **Operational inadequacies**

To effectively operate this type of electricity delivery regime requires a utility to have a minimal level of both technological skill and tacit knowledge (capabilities) within its management structure [73], as well as a need for enough working capital. Without adequate levels of capability, the likelihood that a utility will recover its cost of delivering electricity when it sells it, becomes too uncertain due to both technical and non-technical losses. Technical losses entail a significant loss of electricity in the transmission, through a lack of maintenance of the transmission system – as high as 25% in Tanzania for example [46]; or an inability to operate effectively a demand and supply *load* management, within the network [35]. Non-technical losses entail a significant risk that customers won't pay for the electricity they use [2]: either by not paying their bills, or stealing electricity directly from the grid, or bypassing their electricity meter [71].

This looming spectre of technical and non-technical losses is then compounded by the issue of uncommercial tariffs (discussed in *sect. 3.7).* A combination of these factors will then push the utility towards insolvency, which is only averted by ongoing government subsidies - which are never enough. This stressed condition then results in further poor maintenance of the network, and little carriage of spare parts, which results in the network wearing out [16]. Such

a monopoly utility cannot be regarded as both a credit worthy and proficient partner for a private investor.

Transmission and generation electricity infrastructure are co-dependent and reliable on each other for their commerciality, as value cannot be appropriated from one part of the infrastructure chain, without the other parts. The Lake Turkana wind farm in Kenya, was completed in mid-2017, but the connecting transmission lines connectivity has been delayed into the second half of 2018, as the utility KETRACO has been unable to keep to its construction schedule[21]. This reliability on third parties for connectivity is necessary as it is difficult to capture any value to compensate for the construction costs of missing parts of the infrastructure jigsaw by the original party, if connectivity is what is required, to allow an investment to function and appropriate value.

5.3 **Utility insolvency and subsidy dependence**

When utilities only stay solvent through government subsidies from general revenues (and indirectly, aid), this puts financial pressure on each governments balance sheet: particularly as the incremental cost of the new supply, has been much higher than the original existing supply [2], markedly when mobile diesel generators are used. An aggressive pursuit of such a strategy, has a danger of forcing a financially stretched national government into financial default [71], which introduces a whole new set of risks. This clearly dampens a government's willingness to underwrite a private investor's commercial risk. It is too early to judge how renewable technology will alleviate this issue. They also must justify their financial support of a commercial enterprise over alternative political priorities that are more electorally visible.

5.4 Technological patrimonialism

Lastly, when a government is 'closed minded' to the electricity delivery regime's efficiency: either due to hostility for a new technology application, such as the application of distributive renewable technology over existing fossil fuel technology, as it potentially weakens its control over that delivery regime; or the current electricity regime is used to reward the political incumbent's supporters and is integral to their neo-patrimonialism political structure – it prevents investment, as it creates an unreliable investment partner.

6. Discussion

If SSA governments genuinely believe that the most suitable policy for increasing access to electricity for their populations, involves attracting private investment – then they must also be prepared to amend their current governance structures, to nullify those unintended consequences that make such investment unattractive. Further, these governments must also recognise that unlike natural resource extraction industries, a correctly regulated electricity infrastructure is a 'normal' margin business, that can quickly become uncommercial, and therefore un-attractive as a private investment proposition, if costs increase or revenues decline.

[21] Aldwych International – the developer

Similarly, the development community must also appreciate that the challenge of delivering electricity access within SSA, is essentially an issue of finance: which makes this an enabling variable and a 'gate-keeper' to the resolution of accessibility – electricity connectivity requires a supporting infrastructure for its delivery, which will only exist if it can be paid for (and this includes smaller scale solutions). However, the ability to attract private finance is a dependent variable that relies on its own enabling variables, which include those that surround the process of governance. If the dominant development policy narrative for delivering electricity access to the region is to be successfully constructed around private investment, as the multilateral development community advocates, their approach to governance design also needs to be reprioritised, to include the reduction of investment risk

Ultimately, each of the three governance perspectives – investment, political economy, and systems – has a different foci, and as such each misses aspects that the other perspectives offer. However, a synthesis of all three yields a holistic governance framework, which points the way towards what a more supportive environment for electricity investment might look like.

Drawing from Dixit & Pindyck, [22:3] *(sec 2.2)* – an illiquid investment displays three important characteristics. Firstly, the investment will be irreversible, once an investment has commenced: it can't simply be unwound without a significant loss of value. In our context, construction must be completed, and the commissioning of the asset delivered as envisaged during the planning of the infrastructure, before any value can be realised. Secondly, there will be uncertainty over future value of the investment: a lot of unanticipated things can happen to an electricity infrastructure development project in SSA that could negatively impact on that project's deliverables before an assets operation commences. Thirdly, an investor controls their decision where and when to physically commit their financing and proceed with an investment [22].

Using these three dynamics, it is possible to create three effective 'good governance' filters to determine how to evaluate a supportive governance structure for investment:

(i) Will a country's investment structure allow the reimbursement of the value of the initial investment (the initial cost), in the future?
(ii) Will a country's political structure undermine the appropriation of the anticipated returns of an investment (the rewards); or meaningfully delay them?
(iii) Will a country's electricity delivery regime put an investment at a disadvantage, when compared to alternative comparable technological investment opportunities in alternative countries? (As every investment decision to proceed for a private investor, is a relative decision).

These filters affirm the salience of Financial Investment Governance**:** the private sector investor perspective, which embodies the ability to efficiently create and repatriate investment value. They affirm the salience of Political Governance: the political economy perspective, concerning the application of one-sided asymmetric power, and how this can permit the misappropriation of uncertain and excessive value. They affirm the salience of Technology Governance: the electricity delivery regime perspective, where the system's inability to efficiently innovate and diffuse electricity technology, prevents a necessary appropriation of value that is necessary to make the application of the technology attractive.

When applied to SSA investment in new electricity infrastructure development, our synthesized approach to governance suggest 15 structural factors (some of which are unique to the region) that require appreciation by 'policy actors'. These are factors which negatively impact the ability of the investor to generate and repatriate revenue (which represents both the initial value and the rewards of the investment). Identified structural factors that can be synthesized from across our three unique governance dimensions include:

1. **Insufficient local banking capabilities:** In most SSA countries, the domestic banking systems are unable to finance any significant value of electricity infrastructure projects, even at a household level.
2. **Exchange rate convertibility:** the inability to repatriate the principal investment and the investment's returns, into the foreign investor's original currency - usually attributable to either exchange controls or insufficient African currency liquidity.
3. **Uncommercial tariff regulation:** electricity tariffs are not permitted to be commercially reflective for the cost of the investment
4. **Inadequate Law and Order structures:** In many SSA countries, the institutions of legal enforcement do not prevent theft of various forms of value from an investment, as there is no effective recourse, or they represent the actual perpetrators;
5. **Uncertain security of the physical asset:** the probability that the value of the investment will be diminished or destroyed by an independent third-party's action, such as theft, vandalism, or terrorism;
6. **Uncertain revenue security of the asset:** the probability that an unrelated third party will unexpectedly misappropriate the anticipated revenues (or a percentage of) from the investment;
7. **Unearned equity dilution:** the requirement to allocate significant percentage of ownership (equity) of an investment, in return for nothing other than a permission to proceed.
8. **Rent-seeking:** the attempt to appropriate excess value or 'rent' from an investment that doesn't exist, by non-related beneficiaries of the investment;
9. **Corruption by officials:** the abuse of a power asymmetry, in return for non-obligatory financial gain;
10. **Patrimonialism:** the transference of value to an unrelated party (an insider) to support a political patronage system.
11. **Reallocation of the ownership of a project:** a project's ownership can be unexpectedly lost and reallocated to an unrelated party, usually between the planning and construction phases. This means an instant loss on all preparation costs up to that point by an investor (which are already excessively high)[41];
12. **Path dependency and regime resistance:** the government or the monopolist utility regimes are locked into a technology regime, which makes them hostile to change. For example, the ongoing preference to use coal as an electricity generating technology (often due to personal conflicting priorities).
13. **Insufficient working capital:** there is insufficient working capital available within the utility, to support, operate and maintain the technological system at efficient levels
14. **Deficient technological tacit knowledge and skills:** the successful diffusion of different electricity technologies are impeded, due to a shortfall in both household [68] and institutional technological capabilities [72,73].

15. **A lack of complementary assets**: the supplementary assets or capabilities that are required to allow the primary asset to operate optimally, are not available [74] such as an efficient working electricity grid.

All 15 factors are significant or at least meaningful, and they offer 'policy actors' and researchers a novel checklist when attempting to determine the particular risks facing any given SSA country's infrastructure development.

7. Conclusion

We recognise that we must resist the dangers of overly homogenizing each of the three governance perspectives. Although some of the themes or factors may exist in most SSA countries, national context, resources, business patterns, industry strategies, levels of affordability and types of electricity infrastructure (to name a few) will still yield different shapes, and unfold differently across each country (and indeed, even sub-nationally).

Thus, it is critical to treat SSA countries as heterogeneous, and to craft specific policies attuned to this complexity, accordingly. That said, there is still value to the meta-theoretical governance principles underlying the three perspectives. There is a 'top down' challenge: why internationally sourced private investment is deterred from investing in SSA electricity infrastructure, as well as a 'bottom up' one for why individual governments might or might not constrain such investment. It is also reasonable to apply homogeneity to the international investment community's approach to this challenge, as they have a commonality of purpose in the way they approach investment (*sec 2.2*): they are all seeking an investment return from an initial commitment of investment value.

The implication that arises is a mix of bottom up heterogeneous factors need balanced with the commonality of barriers (and perceptions from private sector finance) to create more attuned policy that arbitrates or mediates local factors with transnational expectations. To minimise these un-intended consequences, SSA governments need to re-design their governance structures to deliver: a minimisation of negative uncertainty to the value of the immediate cost of an electricity infrastructure investment; and a maximisation of certainty towards the future returns of that investment. This will require a government to deliver both cost and policy certainty to investors – as excessive change in either of these, increase costs, which then stops private investment. Finally, governments should discard (or at least adapt), the 'network, hub and spoke' model, and relinquish their utility's monopoly control: as electricity service delivery needs to be decentralised, to permit flexibility in the adoption of new technologies and electricity delivery solutions, to facilitate electricity access in poorer rural areas: where all possible costs need to be stripped out of the process, and maximum flexibility is essential.

The ambition of this paper has been to realign our understanding of the impact of governance, when it is applied to the private financing of electricity infrastructure development in SSA. Perhaps when this occurs in practice, if 'policy actors,' financial institutions, and development practitioners calibrate their investment, political, and technological systems of governance accordingly, SSA can transform itself from a perpetual laggard to a promising leader for electric utility investment and reform.

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